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Pier Luigi Nervi and the art of buildings

Sometimes the names of individuals contain an indication of their characteristics and are almost a predestination; this is the case of Pier Luigi Nervi, whose structures are a sensitive fabric of its buildings scarnificate and discovered much to make them appear continuously vibrating; their harmony is a balance of tension and held shots, repressed, compressed. And his person is.

Ernesto N. Rogers

Engineers to many people, especially to the public, are mysterious figures.

Peter Rice

The Life (1891-1979)

The years of training.

Pier Luigi Nervi was born in Sondrio June 21 1891, by Antonio and Luisa Bartoli, from Savona. Due to the work of his father, director post, spent his youth in several cities of Italy, until he enrolled in the faculty of engineering at the University of Bologna, where he graduated July 28 of 1913¹. These were the years of introduction in Italy of a new material intended to revolutionize the world of construction: concrete. One of the first to interested, both from a theoretical point of view that the practice was Prof. Attilio Muggia² who taught at the School of Engineering of Bologna, which has among its students Pier Luigi Nervi. These newly graduated, he entered the office of the Società per Costruzioni Cementizie which is based in Bologna and of which Professor. Muggia is the director. The First World War and the call to arms in military genius, however, forcing him to a break, from 1915 to 1918. Leave after he returned to work and sent to direct the office of Florence, with considerable autonomy.

¹ University of Bologna, from The historian:
2168 Pier Luigi Nervi di Sondrio (SO), Faculty of Mathematics,
Physical and Natural II years 1909-10
655 Pier Luigi Nervi di Sondrio (SO), Faculty of Engineering, the
Graduate: 28/07/1913.

² Attilio Muggia (1860-1936). Born in Venice, he moved with his family in Bologna where he graduated in 1885 in civil engineering and architecture. University professor, taught until 1935, forming a legion of professionals, some of whom became famous (Nervi, Vaccaro, Mazzoni, Miozzi, etc.). Played an intense occupation, contributing role in the spread of reinforced concrete in Italy, according to the Hennebique. He was director general of the Society for Construction Cementizie founded in 1903, which performed more than 3500 works up to 1924 years of settlement, and worked in Italy, especially in Bologna, Florence and La Spezia. From G. Muggia, Prof.ing. Attilio Muggia the University of Bologna, Tip. Compositori, Bologna 1951

The activity of these early years is characterized by continuous testing of a technique, the reinforced concrete, which seems to have unlimited borders, yet largely to be explored. His work is hectic efforts are the years in which the young PL Nervi work on a massive addition to Florence, where the structure makes the coverage of the cinema hall of Alhambra (1919-1921) in Piazza Beccaria, in San Vincenzo (LI), with the construction of silos load of limestone for the service of Solvay, and also in nearby Prato, a town in the middle of textile industrial revolution, with the birth and development of many textile companies. These need to quickly build large buildings for the production, and the Company for Construction Cementizie responds with the possibilities offered by new technology of reinforced concrete. With so much work, the role and the emoluments of PL Nervi inside the company remain unchanged, hence the decision in 1923 to connect companies with Rodolfo Nebbiosi of Rome, already holds a construction company, and is the "Soc. Ingg. Nervi and Nebbiosi that remain active until 1932. Obviously the relationship with the company become old argument, especially since he was denied the chance of being recognized paternity of the projects carried out for this, the seat of Florence. But his relations with the city are still very strong, as demonstrated by the number of jobs here that will run in the catalog of Nervi & Nebbiosi, and which are not due to the Nebbiosi knowledge that resides permanently in Rome. However, probably after the abandonment of the Directorate of Construction Company Cementizie by Prof. Muggia, which will replace the engineer. Leone Poggi³, relations between this and take positive Nervi, in the form of external consultants.



³ Grandson of the famous designer Giuseppe Poggi of the great transformations of the capital Florence.

In 1924 he married Irene Calosi which will have four children (Antonio, Mario, Carlo e Vittorio) three of whom accompanied him in the work⁴.

An apprenticeship virtuoso.

Nervi in new faces as a businessman and designer, the construction of reinforced concrete roof of the Teatro Vittorio Emanuele of Lavorini' brothers of Montecatini and April of 1924 to cover the work of the theater Bruno Banchini of Prato, (today Politeama Pratese) on behalf views athlete.



The theme of covers of major public spaces fascinates him, and both these works are the prelude to the wonderful coverage beamed radial motion picture theater Augustan society Funicular central Naples, built in 1928-29 and the first significant opera shown by traditional historiography on Nervi.

But still remain in Florence and Prato, where the new company, immediately after the completion of Banchini theater, began construction of one of the largest textile factories in full course for the company Calamai, which include structures with coverage the trusses to stand in reinforced concrete without chain, and where the thrust is absorbed by special stiffening beams on the outside of the coverage, found space where the elevated structure of ventilation required for working in dry cleaners. This building, away from the city center was still intact and has resisted even at the military Germans during their retreat in World War.

Another industrial complex is still intact built in the Valley of Bisenzio, in the Cartia, just north of Prato. Here one of the sheds has a cover with a great time to push out, made not only to absorb metal chains, but also two huge towers of reinforced concrete horizontal seats in the first quarter of each side. The other warehouses, light more modest, are also covered a time, with the thrusts absorbed by reinforcing rods in a hexagonal section.

Nervi also makes more traditional structures, and even less organic, to perform only certain extensions such as the price of the woolen mill

Luigi Pecci, now disappeared. Among the recent major customers Prato, you must surely remember the entrepreneur Vincenzo Cangioli, which will implement the Fabbricone Nervi, whose structures are still intact shed.



Designer and manufacturer.

With this first large group of works ends on association between Nervi and Nebbiosi, and forty years PL Nervi will start a new one with his cousin John Bartoli, also an engineer, whom founded in 1932 in Rome the "Soc. Ingg. Bartoli & Nervi" that remain active even after his death, before being dissolved enforcement dozens of years later. The new company, Nervi important part in a tender in Prato, to build a new bridge drive and a pedestrian walkway on Bisenzio, for direct connection between the new and the old railway station. The Nervi & Bartoli proposing a lightweight walkway absolutely no decorations, a single span of 60 meters of clear light, formed by two arches with slightly different curvature intersected middle, where the armor in iron form a kind of zipper. Not wins and is awarded the tender another Roman society: the Ferrobeton which then build a bridge similar to that proposed by Nervi.

The undertaking Nervi & Bartoli, you must follow the achievements of the Florentine Manufacturing Tobacco, the trampolines and the building of Circolo del Golf at 'Ugolino and an active participation in several yards of the station of S. Maria Novella.

P.L. Nervi is now a mature designer, who works in the same period to the first important and celebrated work of his career: the stadium G. Berta Florence. From now onwards will be occupied by new and important commitments and from his office in Rome Lungotevere Arnaldo da Brescia and shed the Magliana, and leaves little by little the environment Fiorentino. It 'clear that the structures Florence and Prato, were Nervi a kind of laboratory, and an apprenticeship virtuous, which allowed him to

⁴ Antonio 1925 and Vittorio 1930 (arch.) Mario 1926(ing.)

acquire, as will several times when referring to stress the importance of mathematical calculation, that "Static sensitivity" that every designer must mature and which is experimenting on scale models, or better yet on actual structures.

Since the beginning of his career Nervi connects to the best tradition of "technical" European reinforced concrete, introducing new manufacturing processes, especially the prefabrication of structures, with a particular interest in issues of covers, as with show the splendid hanger of Orvieto, Orbetello and Torre del Lago Puccini, commissioned by the Air Force, where more fully develop this concept.

His first structure with a certain resonance was the "cinema teatro Augusteo di Napoli"⁵, realized between 1926 and 1929, when the city of Naples commission to him and Arnaldo Foschini the funicular and the central hall dell'Augusteo. The hall of the theater is made of reinforced concrete, has a circular shape, 30 meters in diameter, with a coverage of two overlapping rings with a skylight at the center opened the diameter of 20 meters, and a mesh link between the two overlapping rings, in which the offices are derived.

But the first job that really gained the interest on the international stage was the town of Florence "Giovanni Berta," a Campo di Marte (today Stadio Artemio Franchi), which Nervi built in 1930-32,



⁵ In 1922, to improve communications with the district of Vomero continuous development, the administration approved a project for the funicular that, starting from Via Roma and the underpass via Conte di Mola, led to Vomero. At the same realization of the funicular, Pier Luigi Nervi, between '26 and '29 created this massive drama, among the largest in Europe than when it was built. Dell'Augusteo The inauguration was held on November 8 1929.

managed to introduce a new wave, laying the Facilities in sight, according to his idea that art is not just aesthetic, but must occur as functionality and static. This stage is a work of great beauty where they detach the roof covering an area of the gallery, the elegant helical stairs to the entrance of spectators and the soaring tower Marathon.

In the stadium in Florence Nervi reflected its confidence in the exceptional "magnificent quality of plastic reinforced concrete" in the creation of structures until then absolutely unprecedented, that all'arditezza constructive solutions and formal bind a large cost of implementation, mainly due to the modularity of the project and the organizational capacity of the yard.

In the period between 1936 and 1942 were designed and built for the Italian Navy, several large underground tanks for Nafta, capacity up to 30,000 cubic meters. with an original technique which ensured the sealing. Between 1935 and 1943 Nervi is dedicated to the construction of giant hanger, on behalf of the Italian Air Force, where in a span arditissime covers only experiences the prefabrication reinforced concrete, "the most beautiful material that humanity has ever invented," adopting ingenious solutions in the design of the time coverage, formed by a small network of ribs of reinforced concrete, which crosses diagonally contributed to donate an impressive lightness to the environment. Of 1936 are the two hanger at the airport geodetic structure of Orvieto, 1940-41 and the six hanger always a geodetic structure, but precast airports of Orvieto, Orbetello, Torre del Lago Puccini, where you applied for the first When the technique of prefabrication. Already these works will notice the marked propensity of Nervi for research on experimental models, to be applied in the study and then for the definition of its projects. The figure of Nervi is used by a fascist regime⁶ to propagate the idea of "progress" and wanted sought by Duce and the public is proposed as an



⁶ "Its quality, reflected in its cultural action, the opposition raised in a radical with the fascist mentality, which you can say ... that was the exact opposite." From PLNervi Paolo Desideri, Zanichelli 1979

idol, so much so that his works were known even by those who barely knew the names of the great masters of the Renaissance.

In the mid-40s develop ferro-cement, with which you can create all kinds of shapes, strong and elastic, composed of layers of steel mesh, filled with cement mortar.

With this material, that Nervi will prevalently as quarterdeck to lose, you get loose ribs, curved or undulating of great visual impact that characterize his entire opera, with bold solutions, made possible by the use of reinforced concrete that often leaves Nervi visible, without covering various coatings.

Little is known of the work of Nervi during the war, while we know that participated actively in the reconstruction, both as a designer and manufacturer who committed as intellectual nell'APAO (see below), and activity related to the organizational work of Gustavo Colonnetti New Chairman of CNR and of UNRRA CASAS.

1947 is the coverage of the swimming pool at the Naval Livorno, with the turn in prefabricated at the foot of opera, with box section to allow the transit of hot inside that prevents the formation of condensation and consequent dripping. E '1952 entry into production of high-pressure pipelines in pre-reinforced concrete, on a case developed by Nervi and built by Nervi & Bartoli. These pipes of diameter up to 2.50 meters in 5.00 meters long pieces. made through a "tower of power" in which the housing containing the spiral reinforcement was dilated during the spurt, through the passage of water subjected to pressure, inside plastic pipes placed inside the housing.

Very interesting is the answer given by P.L. Nervi to the problem of lighting in large hedges, both the functional aspect that under the definition of space: think of the coverage sometimes elliptical hall of the Festival of Chianciano Terme (1952), where the intensity of light gradu with progressive enlargement of the lattice of ribs outward, and that the flat woolen mill Cats of Rome (1952), where slabs of ribs, which follow the evolution of the main events, are effectively exploited by light grazing. Special and interesting buildings for the two stores of salt made in Tortona (1950) on behalf of the State monopolies⁷. In the same period the stock of Montecatini in Porto Recanati, of uncertain but likely Nervi's fatherhood.

The study of the site directs PL Nervi towards the implementation of large-scale prefabrication. It is not a serial type of construction, but the

⁷ The two buildings, like all the storage area salts and Tobacco, have been abandoned a few years and currently are in a bad state of conservation, are in fact ruined the piers connecting with the ground.



application to individual buildings of precast elements serial at the foot of opera, with the use of molds to lose ferro-cement. Like a time, columns, capitals, concrete stone were processed on site, on land, and then assembled in their final location, the elements of his achievements,



instead of being thrown in opera are much more conveniently, produced on land or in laboratory, and then put in place. The outcome of this twenty-year research aimed at exploring new applications of reinforced concrete will give full fruit in the late



Forties, with the creation of extraordinary vaulted roofs of the halls B and C of the Palazzo delle Esposizioni in Turin⁸, which reaches a space of

⁸ "I can say that I have met many times to clients of their duties, ..., as Ing. De Rossi president of Torino Esposizioni, ... when I asked

94,30 x 75.00 meters, made possible by the rigidity achieved through the undulation of web-cutting that creates the frame of 4 cm thick, made with shuttering in ferrocement to lose and, for the first time, with movable scaffolding .



PLNervi possessed the boldness of the engineer, architect imagination and the concreteness of the entrepreneur. Are the opportunities that a company from having allowed themselves to achieve, "turnkey", almost all of its major projects, acting in person at every stage of the process of construction, from first to last brick design.

Nervi's Firm

His son Antonio (1925), became an architect, after two years of apprenticeship in Nervi & Bartoli, is associated in 1952 with Ing. Sergio Musmeci and opens an office, where his father serves as a consultant. In 1954 Musmeci leaves and study becomes "Antonio and Pier Luigi Nervi srl" born firm architecture and construction technique. In 1960 there come the other two children, Mario (1926) and Victor (1930). Start the third long period of the life of Pier Luigi Nervi, designer of the holder of a large international study design, study which will be part of the engineers Mario Desideri and Mario Arlotti, and the architects Giuseppe Positano, Marcello Piacente, Antonio Ruffo, etc. and that will trigger numerous collaborations



what achievements references to the type I could cite a confirmation of the solution. I had not and my answer, ..., at an outsourcer of views was not wide enough to drop the project and fall back on a less economic and more banal "

The 50s consecrates him internationally famous designer and his works itself to the general public, becoming a symbol of evolutionism and continuity with the great artistic past of our country. He lives by leading the reconstruction of destroyed by the bombing, participating actively in initiatives related to Prof. CNR reborn: Gustavo Colonnetti.

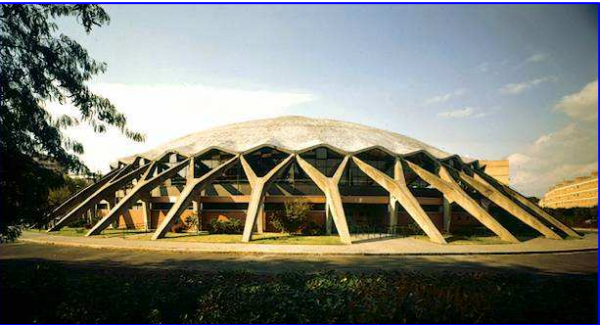
Now internationally renowned designer, admired by Le Corbusier and Walter Gropius, between 1953 and 1957 worked the permanent headquarters of UNESCO in Paris, working with architects Marcel Breuer and Bernard Zehruss. The Palace of the secretariat from the plant to Y, whose structure with reinforced concrete frames 9 floors over basement, where the cross beams of the frames Portal forks exits from pillar to form the support facades with brise - soleil in concrete. The



shape of the pillars in view of the ground floor is determined by the grooved surface linking the elliptical section of the base with rectangular top. Was the scale, with ramps to start the vertical structure of the shape "zigzagante".



The coverage of the conference building, consisting of a lamina "plissettata", crossed by an insole, which rose from below the flap support to the upper middle, with a visual effect very happy. In this coverage, structure and form are identified by creating an extraordinary effect of modernity. Among the later works, some large, like the Fiat plant in Turin (1955) and especially the extraordinary season for the Olympic Games in Rome in 1960.



PL Nervi designs with Annibale Vitellozzi the sporting, the circular building, with wavy dome that rests on 36 Media Y-shaped; Flaminio Stadium, the elevated viaduct of course together with France and Marcello Piacentini realizes one of the symbols dell'Eur: Palazzo dello Sport (now Palalottomatica), a circular building, covered by a ribbed and finished from the outside walls and windows of the original water tank called the fungus⁹. Simultaneously working on the project of the Pirelli skyscraper in Milan (1961, the top 127 mt), in collaboration with Arturo Danusso and Giò Ponti, and then the tower of the Stock Exchange "(1962) in Montreal, with Luigi Moretti, 225 mt to the top 48 floors, to accommodate 5,000 people.



⁹ The singular idea of Pier Luigi Nervi to imagine and plan a mushroom shape of the tank where water still running and connected to the nearby artificial lake, the sports district of Rome, Eur. 50 meters high, is impressive, even charming futuristic and, to some extent, disturbing. Since its birth, the property has hosted top floor, a restaurant, just Mushroom



In Turin, Nervi and his son Antonio win the competition held in 1959 for the design of the Palazzo del Lavoro, to inaugurate the exhibition in 1961, during the celebration of the centennial show of national unity. The short notice from the implementation, only 11 months, contributing to choose the proposed Nervi that through the use of modular and using prefabricated parts and hardware, enables rapid progression of the work. Are characteristic of the sixteen "large umbrellas", consisting of a central pillar in reinforced concrete from which you depart arms steel governing the coverage of the building. The walls outside glass-is supported by a number of pillars that time to absorb the heat expansion and discharging coverage and loft interim, the stresses induced by wind.

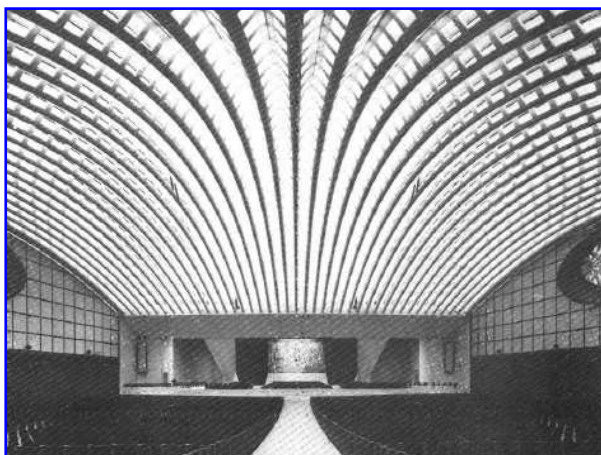


Extraordinary resolution adopted by the Burgo paper Mantua made with Gino Covre¹⁰, with the coverage hung two huge stands in order to obtain a large space within the building to place the machine in continuous production of paper.

¹⁰ Engineer with whom he collaborated, including the metal parts of the Palazzo del lavoro (building work) in Turin.



One day of 1964 Nervi receives an invitation to travel to the Vatican, where Pope Paul VI in person that wants to meet him. At the pope spoke of him Monsignor Costa, the bishop reconcile Ligurian that is cousin of Nervi. Paul VI asked him to design the new hall for general audiences. *"Out of the first meeting shaken and shocked,"* noted engineer Mario Desideri, then the right arm of Nervi: *"The mere idea of having to construct a building in the shadow of the basilica of St. Peter in an authentic inner torment. It was Paul VI to take heart, Nervi and found the usual brave enthusiastically."*



In his long and creative life, P.L. Nervi had a tremendous amount of work in Italy and the world: in San Francisco (the Cathedral of Santa Maria), in New York (the bus station for the George Washington Bridge), in Montreal, Luigi Moretti¹¹ with the Stock Exchange Tower, Norfolk in Virginia to a hall for 12,600 seats (1972).

Too many projects unrealized. From the tower 300 meters high, for the "Monument of the flag" of 1932, to be built on Monte Mario, provided with concrete in the trunk of white Carrara marble and

¹¹ Luigi Walter Moretti (1907-1973) In 1962 he created on behalf of General Property, the Watergate complex (that of political scandal) and the Stock Exchange Tower in Montreal.



inside a huge pendulum, with the heavier mass in the mail subsoil and to guarantee the absence of traction under any loading condition, the revolving house of 1934, the proposal for the "Stadium of Rome" for 100,000 spectators run with the Arch. Cesare Valle and the competition for the auditorium of Rome with the Architects Ignazio Guidi and Cesare Valle, the cathedral of New Norcia near Perth in Australia (1960), and finally the participation in the competition to build the bridge over Strait of Messina.



From quote, because unknown for years and now the subject of major awards, the headquarters of the Italian Embassy in Brasilia, built from 1973 to 1977 designed the study Nervi. It 'an original building, nearly a palafitte, with the pillars tetrapodi, in the shape of trees, which raised the



water of the lake park. The work carried out by Pier Luigi Nervi Minister Nenni in 1968, has a long gestation and ending with the certificate of testing in November 1978. This is the last work of the study. On 9 January 1979 died Pier Luigi Nervi and June 29, after a month of illness, died just fifty-four years even Antonio¹², and then between various events, decades after it came to the settlement of the study and society¹³.

At the end of general Wednesday, 10 January 1979, in the hall "Paul VI", pope John Paul II recalled Pier Luigi Nervi:

He died yesterday in Rome, engineer Pier Luigi Nervi at the age of 87 years. He was also designed and built for this Audiences, whose architectural lines needed to elegance and daring, to harmony and function. As you know, its reinforced concrete construction - in which technology becomes more advanced in terms of true art - made him known worldwide. Recalling with gratitude the distinguished artist, who masterfully helped to devise more and more homes worthy of man, we raise to him a special prayer of suffrage, so that God will accept in your eternal soul of heaven.

Essayist and lecturer.

Men's Study and yard, Nervi was also a university professor and has taught "Technical construction" at the Faculty of Architecture in Rome from 1945

¹² Antonio Nervi (8-8-1925,22-6-1979). From testimony of Francesco Tentori on a day spent at home Bardi that was almost entirely characterized by an evocation by Lina Bo Bardi, with their life, especially Italian, and when you say, about Antonio Nervi: "A young and beautiful high. It was in Sao Paulo and once came with me in a department store, and all inservienti, literally mad for her beauty, had left the job to improvise um homenagem. "

¹³ GU n.55 del 7 marzo 1989: DM01.03.1989 Clearance forced Administrative della soc. SpA ingg.Nervi e Bartoli in Roma. DM.01.03.1989 Liquidazione coatta amministrativa della soc. Srl Studio Nervi in Roma.

to 1962. His current teacher has been characterized by strong will to affirm, work in design, the unit of technical knowledge and talent of formal education. "The structural invention can only be the result of a harmonious merging of personal intuition and creativity of impersonal, realistic, inviolable static science." ... "In all my design work I found that the suggestions static interpreted and defined patient operates a research and proportioning are the most effective sources of architectural inspiration. To me this rule is absolute and without exception. " Today, unfortunately, his legacy of master planning, seems to be collected only from afar. In'45 came his most famous book, "Science or art of building". From 1945 to 1948 publish his articles in a section of *Metron* which is called reconstruction, where by virtue of his training, enhances the importance of scientific research aimed at resolving the housing reconstruction, its cost and speed of execution, through ' development of technology Nervi is also one of the authors of the Handbook of Architets published in Rome in 1946. From No 223 of Casabella in January 1959, at the invitation of Ernesto Nathan Rogers, takes a heading of "critical structures", in order to judge the structures not only in their technical terms, but also as part of the architecture.



Analysis of some significant works

Teatro politeama di Prato.

*"In 1924 he was given the task to Pierluigi Nervi for the coverage of the theater. Nervi was the beginning of his brilliant career and had the audacity to try a new material: concrete. The coverage of the opening Politeama immediately became the symbol of reference and still is an excellent example of technical engineering. The Politeama is still one of the largest in Tuscany."*¹⁴

The theater stands on that at the beginning of last century, the famous athlete Prato Banchini Bruno had used for outdoor arena theater film, theater and entertainment. Other property acquired the docks, on the eve of the Great War, conceived the idea of turning the arena into a Politeama project would be the architect Emilio André. But the performance of proceeded to slow even further to financial problems, in 1920 the huge amphitheater was completed. Finally in the first half of the '20s are laid the foundations for solving the problem of covering the great arena built using the company Nervi and Nebbiosi in Rome. Although the use of reinforced concrete was only the first trials, Nervi managed to solve the problem the broad coverage: a structure consisting of a radial beams offloading of two concentric rings, supported by four pillars in masonry and topped by four rods connected among them to cancel the tension and cooperate with the weld. On this was achieved, in reinforced concrete, the new gallery. The reinforced concrete structures were carried out by specialist craftsmen who came from London, stuccowork the brothers were executed by Chini di Borgo San Lorenzo. The new Politeama Banchini was inaugurated on April 2 1925. After closing in the years 1944-48, was demolished the stairs that surrounded the audience and the theater was named Politeama Pratese.

Signs of the dome collapse required, in 1954 the intervention of that Nervi to consolidate and restore the structure.

Stadio Comunale "Artemio Franchi"

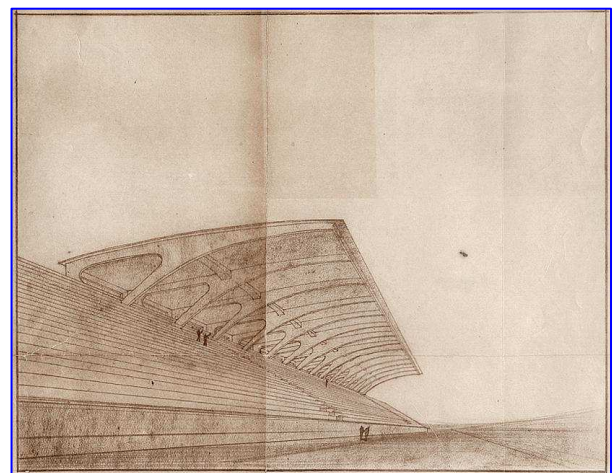
It's February 7 of 1930 the decision to build in the area of the Cure, a new sports, designed by engineer Giuntoli, chief engineer of the Municipality, the type of sports at the same time we were building in other parts of city, including the Giglio Rosso¹⁵, the Galluzzo or to Rifredi and

generally throughout Italy (the so-called "Fields of Sports Littorio"). When everything seemed prepared for the start of work practices inherent in the granting of the land is stalled. It was fortunate, because the city needed a stadium and not another sports ground and to make this area of Campo di Marte, the military domain, was certainly more suitable than the Cure. He was the mayor of the Tuscan capital, Giuseppe Della Gherardesca, along with the secretary general of CONI, Giuseppe Corbari to reach agreement with military authorities for the transfer of land to the city.

It was opened to tender by the municipality, and were made to the technical lot of construction projects, but then it was decided to give directly to the design and construction to the young Pier Luigi Nervi and his company Nervi & Nebbiosi, without conclude the bidding. In a report dated 1 October 1930 the mayor of technical reads: "... In response to Superior provisions This office has asked the Company for Construction and Misty Nervi with satisfaction that has recently run forums in reinforced concrete at Campo Sportivo Giglio Rosso (Red Lily). Evidently Pier Luigi Nervi, he had good knowledge in Florence.

The original draft of the stadium included the construction of the gallery into a single body, covered by a roof with no intermediate support pillars that could impede the view of the spectators. Under the steps needed to place all the necessary services (changing rooms, offices, a gym, etc.).. The play area provided for the soccer field and athletics track of 500 meters, with a straight m. 220.

At the end of July 1930, after the transfer of the piece of land at Campo di Marte by the military authorities began preparations by the company and Pelagatti Vignoli, in charge of the work of earthworks and drainage of the field. Nervi



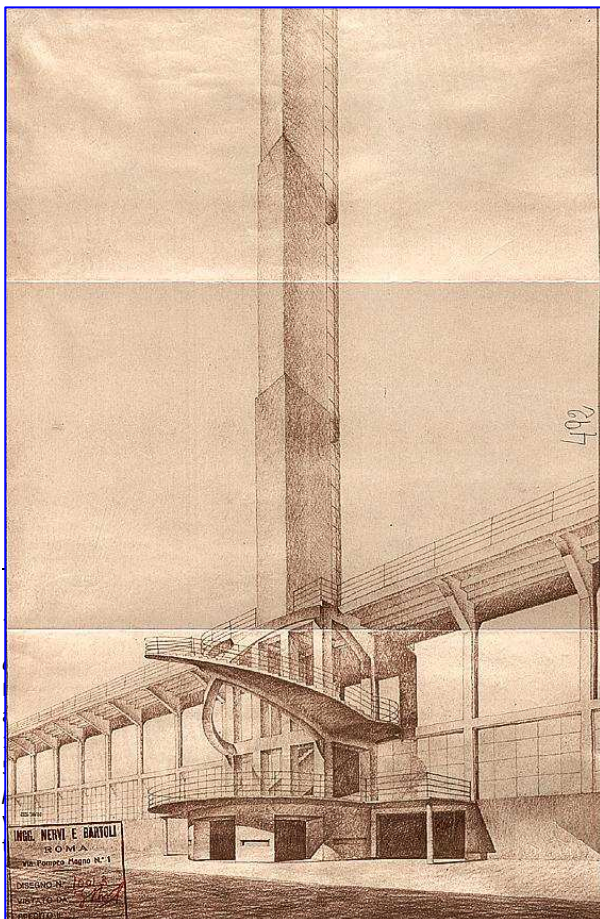
quotation cheaper. In 1934, four years after the inauguration, was ordered closed for the slippage of the building due to the presence of a high layer of clay beneath the foundations of forums that, due to lack of appropriate works of channeling water rain, slipping downwards.

¹⁴ From Book Politeama Pratese. Vita, sorte e miracoli di un teatro, di Mugnaini Olga - Critelli Manuela Editore Cantini 2006

¹⁵ The tribune of the "Giglio Rosso" ("Red Lily") were designed by Nervi and the work carried out by "Nervi e Nebbiosi" after the company participated in a regular race won by the submission of the

presents March 16 1930 to the Municipality for the construction of the first batch of different structures that make up the work - grandstand, steps discoveries, helical stairs, tower of Marathon. The related contract was signed in December 1930¹⁶. The projects were drawn up by executive Nervi between 1931 and 1932 during the execution of the work. Because of difficulties in funding, the construction of the stadium took place in two successive batches, between October 1930 and November 1931 and between July and December 1932. The Newspaper Works of the first batch, indicates the date of 25 July 1930 as the beginning of Trustees of essays and execution of the construction of the gallery and access ladders from 3 December 1930 to June 1 1931, in particular, the cast of spiral staircase of the gallery is recorded in February 1931 and between March and April run the jet of the pillars of coverage of the forum, the disarmament of the loft of the forum itself, the erection of shelves of coverage and reinforcement of the loft coverage. But the desire of hierarchs to have a great stadium, it was decided that the construction of an additional forum, in front of the deck. The work, awarded in May 1931, still a private treaty to Nervi and Nebbiosi, were carried out with speed and efficiency.

The grandstand was completed on 1 June 1931 and discovered that while the tower of Marathon



on September 19 1931. Of note in the conduct of business, the threat of Nervi, formalized in a letter dated 13 July 1931, immediate suspension of works, if the municipality had not taken action to settle the payments, even if late.

On 4 September 1931 are recorded several speeches to complete the grandstand, which on September 10 following is taken over provisionally by the Director of works, the engineer De Reggi. On 19 September 1931 is also prepared the minutes of completion of the work of forums discoveries.

After the break of work due to the performance of the 1931-1932 football championship in June 1932, the Municipal Technical passed to the mayor a request to build new forums, which were to be located in front of the track curves to Podistica, works that were still entrusted to the design and execution of Nervi. After ratification acting Podestà of 13 June 1932, work was started on July 18 1932, conducted with the usual efficiency and speed and ended Dec. 15 of that year.

The work, at least in its main components, was completed and began test operations by Tognetti engineering, operations that ended only in July 1934. Few were highlighted defects in the construction of the stadium, probably related to the speed of its implementation. The most important flaw manifested itself during a race in athletics, when the roof of the grandstand detach pieces of plaster, falling on seats reserved for spectators and fortunately there were only wounded by "scarcity of public" Meanwhile operations had begun testing facilities, launched on 11 September 1931 with the first leg of steps discoveries and completed between November 20 1932 and January 7 1933, with the latest areas of stairs, the spiral staircase Central and a cantilevered deck of the tower of Marathon, in the presence of Eng. Fiorenzo De Reggi of Tech as director of work and of Eng. Nervi, with a high burden of proof to 500 kg/sqm at the request of (compared to 400 kg/sqm required). While the procedure of testing tribune part in schemes sufficiently known, which created special difficulties tester for testing of helical stairs, it was necessary to a real draft of the test mode.

On September 13 the stadium was inaugurated with a match between the AC.Fiorentina (promoted in the championship series "A" for season 1931-'32) and the Admira Vienna. It was decided to name the structure in the Florentine Giovanni Berta, "fascist martyr", to better seal "... the nature and significance of the relationship between sport and method fascist ..." also not passed unnoticed by the fact that the plant had the stadium form of a big "D", which journalists and politicians of not hesitate to bring honor to the will of the Duce. Although, in all



likelihood, Nervi in designing the facility, we saw forced to provide for the atypical form to place in front of the grandstand straight in the 220 meters. From an architectural work of Nervi was exemplary. The development of stairs allowed a maximum capacity of 45,000 seats. Public access was through the stairway of helical shape of great interest for the design and construction for their aesthetic strictly functional. These structures allow the influx of spectators from above, rather than from below, as usually occurred, allowing an influx of spectators more quickly. The outflow, however, was from the bottom through walking leading outside the plant. The central gallery was covered by a roof reinforced concrete that, with its 22 meters to start, was a "record" building. Although the kiosk, once implemented, will speak throughout the world during its construction Nervi was surrounded by distrust of the technicians. As Koenig wrote 40 years on:

"...But few knew what the young engineer had been afflicted for lead in the bottom of its stadium. One of the greatest specialists of reinforced concrete, German by birth, but Italian by adoption, called by the city of Florence as a test in the process, had stated his skepticism in the face of the possibility of resistance of the roof. This line, passing into the mouth to mouth, it became certain that the roof was collapsed, so that the poor Nervi, the day of the disarmament of armor, was the front yard desert. And with the help of assistants to work alone that he had believed the



preparing to remove a person sledgehammer blows of the wedges that had been prepared, as is used in making bridges, including reinforcement of support ...".

Apart from the architectural value of the work, it is essential to stress other aspects of great importance. First of all the economic value.

The cost for each spectator hosted by the British Wembley stadium was about 560 lire per person for the stadium in Bologna, the "Littoriale", built in 1925, 370 lire, while that of Florence, the cost per viewer amounts to about 150 lire.

At the World Cup 1990, the stadium has been a heavy intervention of adjustment, expansion and renovation of facilities. The three helical stairs made from Nervi were added two more bodies scale metal, and there is a new amphitheater inside the place of existing slopes of athletics. The roof of the gallery was also extended with two new metal canopies

The hanger

Designer and contractor with the company Nervi & Bartoli, built between 1936 and 1941, a series of hanger on behalf of the Italian Air Force. Of 1936 are the two hangar at the airport geodetic structure of Orvieto, and of the six 1940-41, always a geodetic structure, but prefabricated, airports of Orvieto, Orbetello, Torre del Lago Puccini, where you applied for the first time the technique of prefabrication. The first two were built in hanger in situ concrete. Their free surface was about 110x45x8mt completely free and with the turn of coverage consists of a double warping arms across square and rotated 45 ° to the long axis. On three sides the time was supported by pillars to stand, while on the main one big central pillar, the center argued enormous beam horizontal mesh board, which were also anchored the guides of the two sliding doors packet, 100 mt overall length. The amount of iron was 25 kg / sq m of floor area and thus the intervention was beneficial in comparison with metal hanger.

The six hanger, besides having slightly different dimensions: 100x36x12, 50mt had only six pillars (four at the corners and two intermediate) and were conducted through the use of prefabrication of the elements of geodetic coverage. The simpler structure, allowed a review of the calculation sufficiently thorough, whose results were later supported by evidence on models. Tavelle in the mantle of armed brick was removed and the plates of eternit were fixed directly to the frame, through the use of precast CA rafters. Unfortunately, these extraordinary works there remains only photographic memory. I destroyed the Germans in their 1944 retreat, making the bombs burst in air from 2.5 quintals at the base of the pillars.

The six hanger, as well as A PL Nervi were then commissioned, under the pressure of war, another set of hanger, smaller, for precast reinforced concrete:

one for the airport **Kilsyth**, (today Pontecagnano) and two for the Idroscalo of Stagnone in Marsala. The need to make savings on materials and timber, was made compulsory and Nervi, on the basis of experience, decided to ease and simplify the structure designing the ribs as a trellis. The surface of the hangar **Kilsyth** 45 x 55 meters was covered by a barrel vault composed of rafters, networked, at the foot of precast reinforced concrete work, discharging their weight directly on two series of thick pillars, arranged on their long sides of the building; warping the secondary, parallel to the longitudinal axis, was always composed by rafters to mesh but less height, and were interspersed by rafters with a T section for fixing the coverage of Eternit corrugated roofing tiles. Unlike the large hanger here the entrance was placed on one of the short sides and closure took place with sliding doors, the side opposite the entrance was buffered masonry with windows at the top. On the two long sides were taken to the

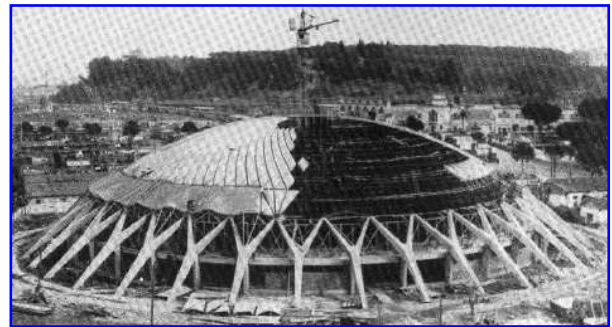


premises for offices, stores, services and housing. This type of structure covered in the patent registered by Nervi in 1939 to No. 377,969. The hangar in Montecorvino Rovella was completed in 1942 and even before the completion of the work was partly used for the coverage already done. In total could contain 46 planes. All three minor hanger of Pontecagnano and Stagnone, were saved from the destruction of war and are still in good condition. The immediate postwar Nervi also designed a hangar in metal structure. The hangar today to use C.O.A. the Forest of state at Rome airport Urbe, remained unknown until now because covered by military secret.

Palazzetto dello sport in Rome

Done at the Olympic Games in Rome, in partnership with arch. Annibale Vitellozzi, this building is a circular of 60 meters in diameter at the base and 21 meters in height at the center. It's consists of a spherical shell, supported on board by a crown perimeter of 36 stands Y-shaped, radially arranged and tilted in the same profile of the dome, and which constitute an extension to the ground, where they are anchored to a large

circular ring of reinforced concrete foundation in precontraine.



The stands for support are connected through the dome of 'structural fans' receiving each 1 / 36 of the overall thrust of the vault. Between two contiguous fans, the degree peripheral cap being small sometimes formed by three triangular prefabricated panels.

The dome consists of 1620 items rhomboidal thickness of 2.5 cm, prepared to land in special shuttering of masonry and laid on a metal scaffolding and positioned by a crane at the center of the building. The erection of the elements of the dome and the cast of ribs and insole have been performed in a month. Inside, beneath the steps that we turn the whole building will be located all services. The building is adaptable to accommodate different types of competitions - basketball, boxing, fencing, gymnastics, tennis - enabling a capacity of 5,000 spectators.

Palazzo del Lavoro Turin

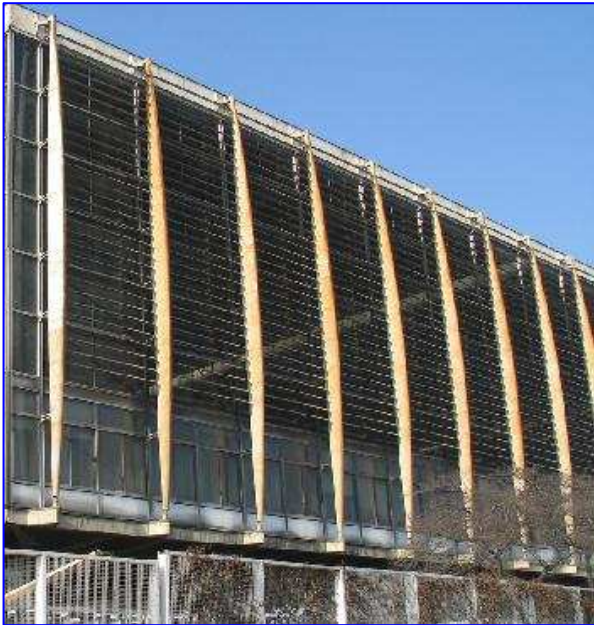
Itinerary of the City of Turin on Architecture of work reads: "Just above the Palazzo a Vela is a huge parallelepiped is the Palazzo del Lavoro by Pierluigi Nervi, which, made in reinforced concrete, glass and steel, did not Load-bearing walls. The turn is supported by 16 columns



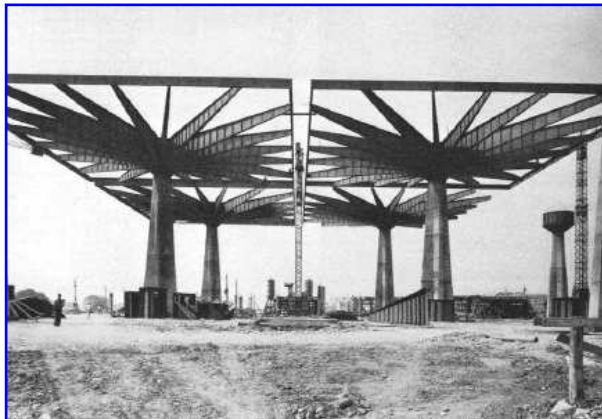
towering mushroom."

Done in the celebration of the centenary of the unification of Italy, when PL and Antonio Nervi win the competition launched in 1959 for the design of the Palazzo del Lavoro, to inaugurate the exhibition of 1961, during celebration of the exhibition. The short time allowed by the call for implementation (11 months) and the size of (25.000mq), the project could only lead to the use of prefabricated elements.

The Nervi's draft through the use of modular, allowing a rapid progression of the work. The building consists of 16 "large umbrellas" 40x40 square meters, consisting of a central pillar in reinforced concrete, from which you depart arms steel governing the coverage of the building. The



16 boxes are spaced 2.50 m. And these spaces are adequately covered by glass skylights, which provide the necessary lighting zenithal. In the area there is an elevated loft, obtained with ribbed cast slabs¹⁷ with shuttering to lose ferrocement. Le-glass external walls are supported by a series uprights of a time absorbing the heat expansion



¹⁷ "disponendo le nervature secondo le isostatiche dei momenti principali."



and discharging coverage and the interim loft the stresses induced by wind.

The state of abandonment in which today the building is located, requires a strong incentive to its preservation.

La cartiera Burgo Mantova

The Cartiera (factory papers) Burgo born at the initiative of engineering Luigi Burgo in northern Italy in 1905. In the period between 1960 and 1980, the Burgo operates a comprehensive plan to rationalize production and differentiation. It assists in recent years to the birth of the establishment of Mantua (1964), at the hands of Eng. Nervi, equipped with a machine for the production of newsprint.

The project was to provide a space of not less than 140 meters long, to contain the vast machinery of production. It was decided for a solution of suspended coverage, with two huge concrete stands, which underpin, through a system of connecting rods, the backbone of cover, designed by Ing. Gino Covre.



Hall Paolo VI



Also known as Aula Nervi is a large auditorium located near the Basilica of San Pietro in Vatican. In 1964, Paul VI appointed Pier Luigi Nervi to create a great room for papal audiences, on the sidelines of Vatican City, in a lot from the Sacristy of St. Peter's Basilica and St. Peter's Square. The proceedings were initiated in 1966 and the inauguration took place on July 30 1971. The House is capable of hosting up to 12,000 people and covered by a dish that focuses public attention towards the stage, where he placed a bronze sculpture of the Resurrection by Pericle Fazzini (1975); large oval windows that light damage inside are John Hajnal.

The big time coverage is composed of 41 corrugated structures, each composed of 18 concrete segments on the ground, varying in size and with large openings to form a curtains of light that welcomes and surprising pilgrims. From the side of the papal throne, a huge beam quarry located at the top of the two huge pillars, collects the thrust of the coverage, while the other side there are 10 pillars smaller.

The horizontal thrust of the coverage is countered by an original system of chains, housed under the walking surface, and self-controlled by a device that allows free to take the profile line, which corresponds to the pre-tension. The floor is a double convex curvature to allow every viewer to see the papal throne.

All the concrete is done with white powder because of Carrara marble.

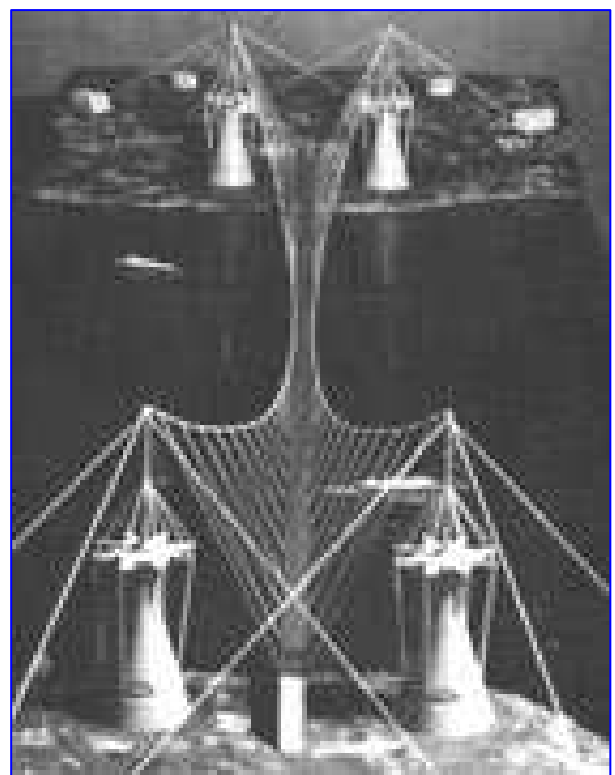
**Speech by Paul VI in conjunction with the new Chamber of hearings
Wednesday, 30 June 1971**

This is the first hearing held in this room. Thus inaugurating this beautiful and great room, that we wished it were built primarily for two reasons: to free the Basilica di San Pietro would now by a multitude of diverse and lively crowd that the hearings Our general, and to offer our visitors a hall to accommodate more suitable.

We must express our satisfaction with the architect Pier Luigi Nervi, designer of this building. Ourselves, they project the size, proportionate to the purpose, we have, in principle, encouraged to "dare", knowing as he had genius and virtue for the company, and how the looming proximity of the Basilica di San Pietro requires not the ambitions of emulation, but the commitment to work groped not petty or trivial, but aware of his privileged position and its ideal destination. It's not that love of power or pomp inspire the design of the new building and you see nothing here that says monumental pride, or vanity ornamental, but the need of things and even more ideas, which are carried out here, thinking reclama large and inspired in those who stop at this place, and not least big ideas and bold in those who had to express its size.

Bridge over the Strait of Messina

"All my effort was directed at eliminating what has been shown to be the true weakness of the major bridges suspended, namely the lack of lateral stability of the decks in respect of actions brought by horizontal wind. The ratio of the width of the deck and its length is already close to a threshold in major bridges suspended achieved, in this case would have been far below this value, so the pattern of traditional suspension bridge with parallel cables had to be necessarily abandoned. Reflecting on the problem of an inherent stability of cross cables and the deck of the result, I am convinced that this stability was achieved quite spontaneously when the two parallel cables instead were willing to form curves bias binding



with a parabolic trend in both the vertical projection in both the horizontal projection. To achieve this it is essential that the support cables to each of the two ends are significantly distanced from them, except in solidarity cables and deck sections of the center."

The international competition for the bridge over the Straits is banned in 1969. On that occasion, there are already two types of suspension bridge with one light: those Sergio Musmeci and Pier Luigi Nervi. The structure of Musmeci is a mix between a suspension bridge and stay a while to Nervi is a suspension bridge with cables to a double curvature trend: the ends of the cables are much away, supported by pairs of pylons spaced far, while in middle are close to reaching a distance equal to the size of the decks. These solutions, although considered very good

technically, if not absolutely brilliant from the point of view, are not rejected.

Appendices

Pier Luigi Nervi and the Association for organic architecture.

The modern architecture in Italy has had a troubled beginning. On the one hand industrial development, economic and social late and not implementing to the peninsula in the same way, on the other hand disappear soon the best exponents of Italian architectural culture of the early twentieth. The genius architect Antonio Sant'Elia (1888-1916) died at twenty-eight years in the First World War, leaving few achievements and some drawings of his idea of futuristic architecture. Between the wars, the same fate had the three highest characters, attempting the renewal of the Italian Edoardo Persico (1900-1936), Giuseppe Terragni (1904-1942) and Joseph Pagano (1896-1945); Italian architecture that come deprived of its best exponents of international standing. In Fascist Italy dominates Marcello Piacentini,¹⁸ ed its eclectic style and monumental. In the fall of fascism was followed a troubled period and in this context, was born in Rome in 1945 by the will of Bruno Zevi, Luigi Piccinato, Mario Ridolfi, Pier Luigi Nervi and others, the Association for Organic Architecture, APAO, with the intention of creating a school in

¹⁸ Marcello Piacentini (1811-1960) has worked intensely throughout Italy, but during Fascism was mainly in Rome who had positions of particular importance. The buildings and the urban interventions made in the Capital does not count: on the one hand it consolidates the image of the architect of the regime and the other connotation significantly the appearance of the city. He created a simplified neoclassicism that he wanted to be midway between the classicism of the twentieth century (Muzio, Lancia, Gio Ponti and so on.) And the rationalism of the Group 7 and Miari of Giuseppe Terragni, Giuseppe Pagano, Adalberto Libera etc. ... In reality Piacentini was far from both movements, however, managed to create an original style, with an eclectic but distinctly in the search for monumentality typical of the aesthetic trends of the time. The references to the classical tradition will be, especially since the '30s numerous, contributing to the establishment of that style Littorio so dear to Mussolini and the Fascist high hierarchies. His most ambitious achievements were the creation of the City University of Rome (1932) and coordination for the design of the famous E42, namely the Universal Exposition of Rome that should have been held in 1942 and that he cared either as designer, Along with Luigi Piccinato and others (1938) and then as commissioner general for the will of the head of government. He was a member of numerous influential committees, including those for the master plan of Rome of 1931 and its variant of the 1942. Professore of urban architecture in the Faculty of the University La Sapienza of Rome until 1955, which was also dean. After the fall of the fascist regime was un'effimera cleanup and soon returned to teach. His many projects Postwar suffer from a certain weariness, which finds its acme in the restructuring of the Theater of Rome of 1960. At his death, he fell on the pitiful court Destructive Bruno Zevi, which the architect described as "dead in 1911." The time and greater reflection led to a reassessment of some works by Piacentini since 1911. From Wikipedia

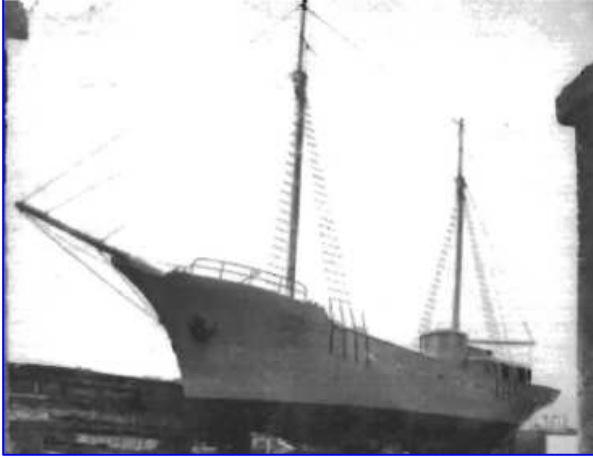
contrast with models reactionary Commandant of the Faculty of Architecture in Rome and awaken the modern Italian architecture. Reads the text of the declaration of principles dell'APAO appeared in the magazine "Metron, No. 2, 1945:" ... *The genesis of contemporary architecture is essentially in functionalism. Whatever today the evolution of functional organic architecture, we believe that functionalism is the root of modern architecture, and not in the current styling neoclassical, not in the provincialism of styles minors ... The organic architecture is a social, technical and artistic at the same time, to create the environment for a new democratic civilization. Architecture organic architecture means for humans, modeled according to the human scale as needed spiritual, psychological and material of man ...* " Given the era in the association are also social and political implications that enhance the cultural message of the birth of an Italian organic architecture, based on the values of freedom and democracy. The Association for Organic Architecture leads to Rome in 1945 to an Organic Architecture School at Palazzo del Drago, with four courses: Urban Planning (Luigi Piccinato), Architecture (Mario Ridolfi), Construction (Pier Luigi Nervi), Vocational subjects (Aldo Della Rocca). Born magazine "Metron", co-directed by Luigi Piccinato and Mario Ridolfi.

Among the magazines of Italian architecture, Metron is perhaps the most fierce in the dialectic on the issue of reconstruction. The historiographical dell'APAO, including growth of Metron, assumed that the origin of modern functionalism in both. Pier Luigi Nervi, published in 1945-48 his articles in a section of Metron which is called Reconstruction. By virtue of his training, he extols the importance of scientific research aimed at resolving the housing reconstruction, its cost and speed of execution, through the evolution of technology. Nervi is also one of the authors of the Handbook published by the architect in Rome in 1946, under the patronage of the CNR of Gustavo Colonnetti and Finance United States Information Service (USIS), which is distributed free to professionals.

The A. P.A.O. from Rome spread quickly throughout Italy gathering the best of modern forces, from Piedmont to Sicily. In 1947 I held the National Congress of the Association for Organic Architecture. In 1950 the APAO, having played its role in unification and stimulation of innovative of Italian forces, is and will remain dispersed overwhelmed by the "building boom" of post-war reconstruction, while his ideas are scattered in all major Faculty of Architecture, where will their fruit.

The Ferro-cement.

It seems that the idea of achieving containers through the use of cement mortar reinforced with wire mesh, was Joseph Luis Lambot, an enterprising farmer French, that around the middle of 1800, was built with this technique, pots for plants, tanks and a small rowboat. This technique,



while continuing to be used mainly for the construction of boats, however, remained in second place until the beginning of the 40s of last century, when PL Nervi began to take an interest in depth, driven by the feeling that, to overcome the limitations of traditional manufacturing processes.

Nervi begins a journey of study and research that involves the prof. G. Oberti and G. Grandori, the laboratory tests of the Politecnico of Milano in order to verify if *"definitely increasing the spread of iron and its percentage, could not make a material of higher strength and foremost lengthen and greater flexibility"*

The results of tests conducted on slabs of varying thickness between 1 and 6 cm., Constructed by fratazzatura continuous mortar cement determined to 8-10 q.li to mc. and fine sand, with many overlapping (also 10) layers of wire mesh fine¹⁹ because of some surprising 500kg/mc were doing Nervi to say that *"the insoles to equal spread armor, ..., have compared to homogeneous materials capable of resisting pressures of tension and compression of the same order of magnitude" and that can "achieve without injury, a stretch five times greater than that of mortar unarmed. "*

On 15 April 1943 Nervi deposits patent: "Further construction of slabs, plates and other armed cement." *It is the official birth of ferro-cement, a new material that will allow the creation of "membrane resistant to pressure and tension, undulating, bent and curved as best wishes. "*

¹⁹ networks of metal type to be false, with soft iron wire from 0.5-1.5 mm to 1 cm mesh, placed a multiplex.

From 1943 to 1948 P.L. Nervi experiments on the technique boats, which are built in shipyards half of Anzio. The first boat made of ferro-cement, is the motor Irene 145 ton. while the last is the sophisticated ketch "Nennele" of 1948, a sailboat shell with only 12 mm.

Nervi, who will return to building boats in the '70s on behalf of FAO and the Josefa, his private boat begins to use the ferro-cement like to lose housing for his great works, otherwise *"impossible for cost and time."*

A small building, appearing in ferro-cement, is realized by Nervi in the square of Nervi & Bartoli to Magliana. It 'a warehouse 21 x 12 meters, with walls and roof membrane wavy ferro-cement than 3 cm. thick.

Later Nervi used ferro-cement, in practically all his

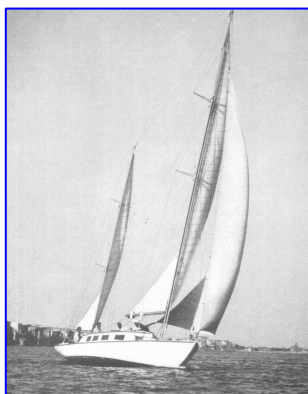


works, and where it is decisive factor, both from the technical side, that architectural and especially economic. A single way of example is the case for *"the big wavy time of 98 mt of light to cover the central hall of the complex di Torino Esposizioni ... formed from the combination of precast ferro-cement, ..., supplemented by ribbing thrown in opera . It 'obvious that a structure of this kind built with the usual systems would have asked for a job casseformi impossible for cost and time."*

To conclude the chapter in his book "Building successful" (1955), PL Nervi will assess and make a wish:

"I think these first results, with all my justifiable optimism, allowing the prediction of an ever broader development of ferro-cement.

Above all it can make constructive use of the entire field of resistant structures to form, such as



corrugated surfaces, and sometimes subtle, field that encompasses the brightest promises of the new architecture.

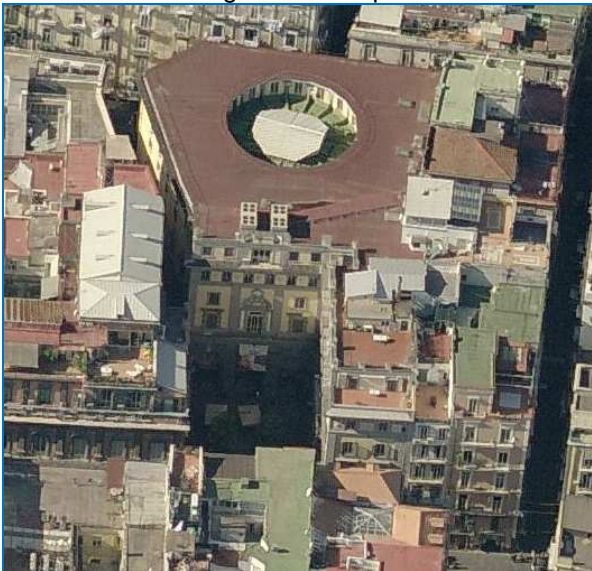
Unfortunately, the words and teaching of Nervi, have flown away, with the breeze that blows constantly on Italy.

The ferro-cement is not taught, is not considered by the rules, and is used only for works of bricolage.

Chronology of the most significant work

1923 Copertura del Teatro Politeama di Prato.

1926/29 Teatro Augusteo di Napoli



1929/32 Stadio Berta (ora "Artemio Franchi") (Fi)

1930/32 Progetto di Aviorimesse circolari in cemento armato.

1932/35 Progetto per uno stadio a Roma.

Vari cantieri della stazione di S. Maria Novella (Fi)

Tribune del campo sportivo Giglio Rosso (Fi)

1932 - Progetto di una casa girevole.

Fabbricato del Circolo del Golf all'Ugolino (Fi)

1935 ca Serbatoio pensile da 100mc presso il fabbricato servizi della stazione di Santa Maria Novella a Firenze

1935/36 Progetto di un ponte in Valle Biedano (Vt)

1936/42 Serbatoi per nafta Marina italiana

1935/38 Aviorimesse di Orvieto.

1937/40 Manifattura Tabacchi Firenze

1937/42 Cisterne sotterranee per combustibile.

1938 Progetto di silos per la Solvay, Rosignano.

1939 Progetto di un viadotto.

1939/42 Progetto di Aviorimesse per l'Aeronautica militare (Orvieto, Orbetello, Torre del lago).

1940 Progetto del Padiglione della Civiltà Italiana e del Padiglione dell'Acqua e della Luce (EUR) - Roma

1942/43 Motonave in cemento armato di 400 tonnellate.

1943 Progetto di una volta con luce di 200 m per una stazione ferroviaria.

1945 Progetto di un ponte sull'Arno

Magazzino in ferro e cemento a Roma

1946 Progetto della stazione centrale di Palermo e progetto di una casa circolare prefabbricata.

1947 Darsena del conte Trossi a S.Michele di

Pagana a Genova.

1947/49 Piscina per l'Accademia Navale di Livorno

Palazzo delle Esposizioni, Salone B, a Torino.

1948/50 Progetto di una copertura a Shed isolante.

1949 Progetto di una Aviorimessa a Buenos Aires.

1949/50 Palazzo delle Esposizioni di Torino Salone C.

1950 Salone del Casinò Kursaal ad Ostia (Roma).



1950/51 Magazzini per il sale di Tortona.

1951 Progetto di un ponte sul fiume Reno a Sasso Marconi. (Bo)

1951/52 Manifattura Tabacchi a Bologna



1951/53 Lanificio Gatti a Roma.

1952 Copertura delle Terme di Chianciano.

1952/53 Tubature a pressione, sistema Nervi.

1953 Progetto del Palazzo dello sport di Vienna Stabilimento Lancia di Torino.

1953/58 Palazzo dell'UNESCO a Parigi (in collaborazione con gli Arch.tti M. Breuer e B. Zehruss).



1954 Stazione Centrale di Napoli
 1954/55 Stabilimento Fiat di Torino.
 1955 Progetto di ponte sul fiume Tenna.
 Progetto del Centre National des Industries et Technologiques a Parigi.
 1955/59 Progettazione strutturale del Grattacielo Pirelli a Milano in collaborazione con Arturo Danusso, su progetto architettonico di Giò Ponti.
 1956 Progetto per un centro di esposizione a Caracas
 1956/57 Palazzetto dello Sport di Viale Tiziano a Roma, in collaborazione con l'architetto A. Vitellozzi.
 Stadio Olimpico Comunale Carlo Zecchini di Grosseto
 1957 Progetto dell'Aeroporto internazionale Leonardo da Vinci (Roma)
 1957/59 Stadio Flaminio di Roma (In collaborazione con Antonio Nervi)
 1958 Progetto di una cattedrale a New Norcia, Perth, Australia.
 1958/59 Palazzo dello Sport dell'EUR (Roma) in collaborazione con l'Arch. M. Piacentini
 1958/60 Viadotto di Corso Francia (Roma)
 1958/61 Stazione ferroviaria di Savona. in collaborazione con l'arch. Antonio Nervi.
 1959/60 Palazzo del Lavoro (Torino) in collaborazione con l'arch. Antonio Nervi
 1960 Progetto per la Fiera del Mare.
 1960/62 Bus Terminal George Washington Bridge, New York City.
 1961 Progetto di un ippodromo coperto a Richmond, Virginia.
 1961/62 Progetto in collaborazione con l'Arch. Luigi Moretti del complesso "Victoria Square" di Montreal - Canada,
 1961/63 Cartiera Burgo (Mantova)
 1961/67 Consulenze strutturali per edificio Australia Square (Sydney)
 1962 Progetto del centro commerciale Schedeldoekshaven a Aia (Olanda).
 1963 Nuova sede della cassa di Risparmio di Venezia.
 1963/68 Ponte del Risorgimento a Verona.
 1964 Progetto per una piscina coperta tipo.
 1966 Stabilimento Cromodora Venaria Reale (To);
 Progetto del palazzetto dello Sport di Vicenza;

1966/71 Nuova aula delle Udienze Pontificie in Vaticano (Aula Paolo VI)
 1966/71 St. Mary Cathedral, San Francisco, California con Pietro Belluschi
 1967 Progetto di chiesa a Trissino;
 Progetto per l'Auditorium dell'università di Bochum, Germania;
 Progetto di Hockey Rink al Dartmouth College, Hannover
 Progetto Autogrill Motta a Padova.
 1968 Nuova officina Carte Valori della Banca d'Italia.
 1968/78 Progetto dell'Ambasciata Italiana a Brasilia.
 1969 Progetto del Ponte sullo Stretto di Messina
 Progetto del Palazzo dello Sport di Milano

Le ultime opere cui partecipò P.L. Nervi, come consulente furono il museo Pitt Rivers a Oxford, il Centro di Buona Speranza (Città del Capo - Sudafrica) la stazione di Cosenza, il progetto dell'Ampliamento della Cattedrale di Portsmouth UK, il progetto di uffici finanziari a Verona, il progetto per il Cultural and Convention Center di Norfolk, Virginia; il progetto del centro culturale di Tripoli; il progetto per la nuova sede del Bureau International du Travel a Ginevra.

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la breve monografia di Giulio Carlo Argan per la collana "Architetti del movimento moderno" del Balcone nel 1955;

la monografia in forma sostanziale di rassegna iconografica curata da Jürgen Joedicke e coedita da Gerd Hatje e Comunità nel 1957; l'entusiastico volume di Ada Louise Huxtable di edizione anglo-americana e subito tradotto in italiano dal Saggiatore (1960);

l'articolata monografia di Agnoldomenico Pica da Editalia, Roma, nel 1969

Dopo dieci anni esce il volumetto di P. Desideri, P. L. Neri jr., G. Positano "Pier Luigi Nervi", Zanichelli, Bologna, 1979

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Tullia Iori, Sergio Poretti, Pier Luigi Nervi. L'Ambasciata d'Italia a Brasilia, Electa, Milano 2008

Giuseppe Guancio, Costruzioni & sperimentazione L'attività del giovane Pier Luigi Nervi a Prato CGE 2008

I fondi archivistici relativi a Pier Luigi Nervi sono oggi suddivisi tra due archivi pubblici, il Centro studi e archivio della comunicazione (Csac) dell'università di Parma e la sezione degli archivi di architettura della Direzione generale per l'architettura e l'arte contemporanee (Darc) del ministero per i Beni e le attività culturali.

Awards and honors

Professore Titolare, per incarico, della Cattedra di Tecnologia e Tecnica delle Costruzioni della Facoltà di Architettura di Roma (dal 1946 al 1961).

Cavaliere di Gran Croce al merito della Repubblica.

Membro del Consiglio Superiore dei Lavori Pubblici.

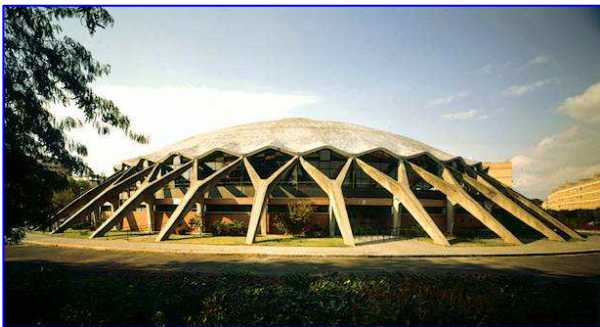
1956 Presidente della Sezione Italiana dell' "Union Internationale Architects"; Honorary Member of American Institute of Architects.

1957 Brown Medal del Franklin Institute, Philadelphia

1957 Honorary Member of The American Academy, Institute of Arts and Letters

1958 Membro della classe stranieri della Accademia Reale di Belle Arti di Stoccolma

1958 Medaglia Exner-Ost-Gewerbevereinis,
Vienna
1959 Membro corrispondente della Academia
Nacional de Ciencias exacta, Fisicas y Naturales
di Buenos Aires
1960 Membro dell'Accademia San Luca Honorary
Member American Academy of Arts and Sciences
di Boston.
Membro corrispondente della Bayerischen
Akademie der Schoenen Kuenste di Monaco.
1961 Membro a vita dell'Istituto Internazionale di
Arti e Lettere di Zurigo "Charles Eliot Norton"
1961-62 Professorship per Anno Accademico
all'Università di Harvard. 1963 - Premio Alfred E.
Lindau-American Cement Institute
1963 - Premio Concrete Industry Board, New
York
1963 - Medaglia Emil Morsch del Deutsche Beton
Verein
1964 - Medaglia d'Oro dell'American Institute of
Architects, St. Louis USA
1968 - Medaglia d'Oro dell'Institute of Structural
Engineers, Londra
1968 - Premio Internazionale Feltrinelli per
l'architettura, Roma



Recognition professional addition to numerous
honorary degrees conferred by universities
around the world:: Buenos Aires (1950),
Edimburgo e Monaco e Varsavia (1961), Harvard
e Dartmouth College (1962), Praga (1966),
Londra (1969).

Credits

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S. Poretti, Un tempo felice dell'ingegneria italiana. Le grandi opere strutturali dalla ricostruzione al miracolo economico, «Casabella», N.739-740, 2006, pp. 6-11; also to the many works of Prof.sa Ing.Tullia Iori riportati sul sito: www.tulliaiori.com

Thank to Prof. Peter Häußermann University of Applied Sciences of Biberach, Germany.

***The structures are built for a well-defined purpose.
 This utility is one of substantial differences with the sculpture: there is a structure that is an end in itself.***

Mario Salvadori

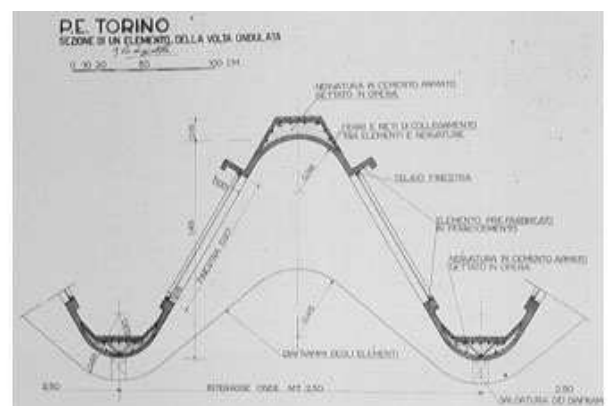
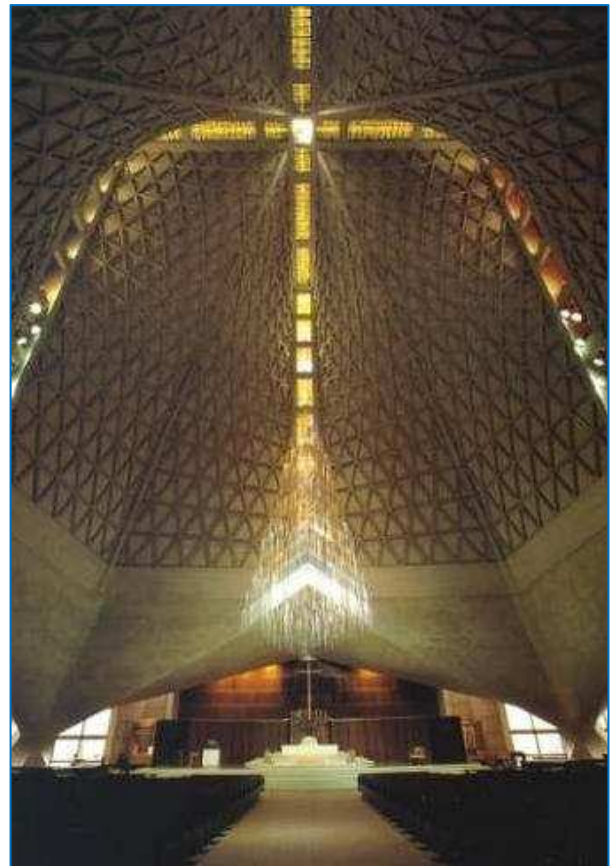
Cover photos: Palazzo exposure Turin

Photos of Retro: sporting Rome

Photos on the next page, and from left to right:

"The mushroom"

the inside of St. Mary Chatedral in San Francisco,
 the grillage loft of the church of Borgo Panigale,
 elements of Ferrocement Palazzo exposure in Turin



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